Claims

I claim:

1. A dual ratio belt drive system comprising:

a clutch unit mounted directly to a driver rotating shaft;

a one-way clutch mounted directly to said driver rotating shaft;

a plurality of rotating accessories rotatably connected to said clutch unit and rotatably connected to said driver rotating shaft through said one-way clutch such that said accessories are driven by said clutch unit at a first speed ratio and driven directly by said driver rotating shaft through said one-way clutch at a second speed ratio, with said clutch unit operating at a predetermined value of an engine operating condition thereby defining the transition between said first and second speed ratios; and

said clutch unit being engaged at engine start.

2. The system as in claim 1, wherein said first speed ratio is greater than said second speed ratio.

3. The system as in claim 1, wherein said clutch unit comprises an electromagnetic clutch.

4. The system as in claim 1 further comprising a controller for causing said clutch unit to operate at said predetermined value.

5. The system as in claim 4, wherein said controller receives inputs from a plurality of sensors.

6. The system as in claim 5, wherein said controller calculates said predetermined value based on at least one of a plurality of sensed operating conditions, with said sensed conditions comprising accessory load, engine speed, battery charge, throttle position, engine coolant temperature, vehicle gear selection,

vehicle speed, manifold absolute pressure, ambient air temperature, air mass flow rate or accelerator position or a combination of two or more of the foregoing.

7. The system as in claim 6, wherein said controller causes said clutch unit to begin disengaging at said predetermined value until said clutch unit is fully disengaged, thereby defining a disengagement period, with said disengagement period being about 3 seconds.

8. The system as in claim 6, wherein said controller causes said clutch unit to begin engaging at said predetermined time after engine start until said clutch unit is fully engaged, thereby defining an engagement period, with said engagement period being about 3 seconds.

9. A dual ratio belt drive system comprising;

a clutch unit directly mounted to a rotating shaft;

a one-way clutch comprising a damper, the one-way clutch directly mounted to the rotating shaft;

at least one accessory rotatably connected to the clutch unit and to the one-way clutch such that the accessory is driven by the clutch unit at a first speed ratio and is driven by the one-way clutch at a second speed ratio;

the first speed ratio and second speed ratio selected by an engine operating condition; and

the clutch unit is engaged at engine start.

10. The system as in claim 9, wherein the clutch unit comprises an electromagnetic clutch.

11. The system as in claim 9, wherein the one-way clutch damper further comprises elastomeric material.

12. The system as in claim 9, wherein the first speed ratio is greater than the second speed ratio.

13. A dual ratio belt drive system comprising:

a clutch unit directly connected to an accessory rotating shaft;

a one-way clutch directly connected to a second rotating shaft;

the accessory rotating shaft rotatably connected to the one-way clutch such that the accessory is driven by the clutch unit at a first speed ratio and is driven by the one-way clutch at a second speed ratio;

the first speed ratio and second speed ratio determined by an engine operating condition; and

the clutch unit is engaged at engine start.

14. The system as in claim 13, wherein the one-way clutch further comprises a pulley and an inertial member.

15. The system as in claim 13, wherein the one-way clutch comprises a damping member.

16. The system as in claim 13, wherein the clutch comprises an electromagnetic clutch.

17. The system as in claim 15, wherein the damping comprises elastomeric material.

18. The system as in claim 13, wherein the first speed ratio is greater than the second speed ratio.

19. A dual ratio belt drive system comprising:

an engine;

a motor generator;

an accessory having an accessory shaft driven by the motor generator or by the engine;

a clutch unit operatively disposed between the motor generator and the engine, the clutch engaged whereby the motor generator starts the engine;

a one-way clutch operatively disposed between the engine and the motor generator, the one-way clutch engaged whereby the engine drives the motor generator;

the accessory connected to the clutch unit and to the one-way clutch such that when the engine is operating the accessory is driven by the clutch unit at a first speed ratio and is driven by the one-way clutch at a second speed ratio, the first speed ratio and second speed ratio selected by an engine operating condition; and

the clutch unit disengaged for operation of the second speed ratio.

20. The system as in claim 19, wherein the clutch unit further comprises an electromagnetic clutch.

21. The system as in claim 19, wherein the clutch unit is disposed on an engine crankshaft.

22. The system as in claim 19, wherein the clutch unit is disposed on the accessory shaft.

23. The system as in claim 19 further comprising a dual pulley disposed on the accessory shaft.

24. The system as in claim 19 further comprising a vibration damping member disposed between the accessory and the engine.

25. The system as in claim 21 further comprising a vibration damping member disposed between the one-way clutch and the accessory.

26. The system as in claim 22 further comprising a vibration damping member disposed between the one-way clutch and the motor generator.

27. A dual ratio clutch comprising:

a hub;

a first pulley rotatably connected to the hub through a one-way clutch;

a second pulley rotatably connected to the hub; and

a brake member connected to the hub, the brake member engagable with the second pulley, the brake member when energized locks rotation of the second pulley with rotation of the hub.

28. The clutch as in claim 27, wherein the brake member comprises an electromagnetic coil.

29. The clutch as in claim 27 further comprising a damping member disposed between the hub and the first pulley.

30. The clutch as in claim 27 further comprising a bearing disposed between the second pulley and the hub.

31. A dual pulley comprising:

a hub;

a first pulley rotatably connected to the hub through a one-way clutch;

a second pulley connected to the hub; and

a damping member disposed between the second pulley and the hub.

32. The dual pulley as in claim 31, wherein the first pulley comprises a ribbed profile.

33. A dual ratio clutch comprising:

a housing;

a first pulley rotatably engaged with the housing;

a second pulley rotatably engaged with the housing;

a brake comprising an electromagnetic coil and plate, the plate disposed between the first pulley and the second pulley;

the brake when engaged synchronizes rotation of the first pulley and the second pulley; and

the second pulley connectable to a rotating shaft, the rotating shaft concentric with the second pulley.

34. The clutch as in claim 33 further comprising a biasing member disposed between the plate and the second pulley, the biasing member urging the plate away from engagement with the first pulley when the electromagnetic coil is not energized.

35. The clutch as in claim 34, wherein the electromagnetic coil is directly connected to the housing and contained within a width of the fist pulley.

36. The clutch as in claim 34, wherein the plate has a frictional engagement with the first pulley.

37. The clutch as in claim 33, wherein the first pulley further comprises a damping member.

38. A dual pulley comprising:

a hub;

a first pulley rotatably connected to the hub through a one-way clutch;

a second pulley connected to the hub; and

a damping member disposed between the first pulley and the one-way clutch.

39. The dual pulley as in claim 38, wherein the first pulley comprises a ribbed profile.

40. The dual pulley as in claim 38, wherein the first pulley further comprises an inertial member.